

UTC Institute for Advanced Systems Engineering Distinguished Lecture Series



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UAV Formation Operations: Recent Developments

Wednesday June 24, 2015 11 a.m. – 12:00 p.m. Storrs Campus, Dodd Center, Konover Auditorium

Abstract: Formations of mobile agents, including unmanned airborne vehicles, may often be used to localize objects in the environment. Simultaneous measurements are obtained by the agents in the formation from the target object, which can be fused to determine the object's location. Operating formations this way requires at least two separate capabilities. One is the ability to control and maintain the formation shape, and the other is to move the agents in the formation with a common velocity. Both objectives should be pursued with control schemes that are as autonomous as possible, and scale with formation size. Both objectives also require that agents be able to sense the relative position (i.e. range and direction) of other agents in the formation, or at least some of those other agents such as neighbors, i.e. those agents which are physically close.

This talk reviews procedures for formation shape control, and for achieving velocity consensus of formation agents, and then moves on to consider how these tasks can be achieved when there is *limited sensing*, in particular where the formation agents may be able to sense either the bearing of their neighbors, or the range of their neighbors, but not the relative position (bearing and range) of their neighbors.

Speaker Biography: Brian Anderson was born in Sydney, Australia, and educated at Sydney University in mathematics and electrical engineering, with PhD in electrical engineering from Stanford University in 1966. He joined ANU as its first engineering professor in 1982 and is now a Distinguished Professor in the College of Engineering and Computer Science and Distinguished Researcher in National ICT Australia (NICTA). His research work has focussed on problems of automatic control and signal processing. For this work he has won a number of international prizes and medals, and is a Fellow of the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering, the Royal Society (London), an Honorary Fellow of the Institution of Engineers, Australia, and a Foreign Member of the US National Academy of Engineering. He holds honorary doctorates from a number of universities, including Université Catholique de Louvain, Belgium, and ETH, Zürich and five Australian universities. He is a past president of the International Federation of Automatic Control and the Australian Academy of Science. He served as the first President of National ICT Australia (NICTA), and was a member of company boards, including Cochlear Ltd, the world's major supplier of bionic ears, and a member of the Prime Minister's Science Council under three prime ministers. He received awards from both the Australian and Japanese Governments.